March 20, 2008

Bob Cronholm
Montana Department of Environmental Quality
Permitting and Compliance
Hardrock Mining Program
P.O. Box 200901
Helena, MT 59620-0901

RE: Rock Creek Mine Evaluation Adit Infiltration Pit Non-Degradation Analysis

Dear Bob:

This letter and attachments serve as an analysis of the proposed discharge of Rock Creek Evaluation Adit treated waters through infiltration. This information is provided generally following the structure of Form GW2 – Ground Water Pollution Control System Requirements for review and approval. With the exception of Figures 1, 2 and 3 and Tables 1, 2, and 3, the figures and tables referenced in this submittal refer to existing figures and tables in the Revised Application for Exploration License submitted by RC Resources, Inc. (RCR). The figure and table numbers from the Exploration License Application have been maintained as shown in the revised application.

Form GW2 – Ground Water Pollution Control System Requirements

(a) Facility, Site Information and Land Ownership:

The Rock Creek Evaluation Adit Project is located in Sanders County, Montana. The proposed evaluation adit would be driven prior to other work on the Rock Creek Project in an attempt to better understand the configuration of the ore body. Discharge waters will be directed through a treatment system to infiltration ponds as described in detail below. A vicinity map depicting surface water, water supply wells, and springs along with ownership of water features within one mile of the proposed infiltration Outfall is shown in **Figure 1**. Land ownership within a one-mile perimeter is shown in **Figure 2** and **Table 1**. An inventory of private water supplies in the area is provided in **Table 2**.

(b) Outfall Location, Collection System, Treatment System Capacity, and Disposal System:

RC Resources, Inc. has included in their Exploration License Application an infiltration/percolation pit located at 47° 59’ 12” North, 115° 44’ 11” W (Outfall). During the mining phases of development, water originating at the evaluation adit, including transportation runoff, groundwater collected within the adit, and stormwater, will be conveyed to surge ponds prior to entering the wastewater treatment plant for

processing. Wastewater discharged to this Outfall will come from the water treatment plant.

Following test pit excavations in 2006, the above location was identified as suitable stratigraphy for percolating treated water from the Rock Creek Exploration adit (**Figure O-1 and Figure O-2**). The proposed infiltration pit will be situated in coarse, poorly graded basal gravel, underlying lake sediments and overlying fractured bedrock. Percolation tests conservatively estimate the basal gravel percolation rate to be a minimum of 144 ft\day (RC Resources, 2008b).

Water flow rates pumped from the mine will vary depending on the water inflow to the mine. Based on the project water balance presented in the Water Management Plan for Alternative 5 – Surface Disposal of Tailings Paste (Hydrometrics, 1997), flow into the evaluation adit could reach sustained rates up to 168 gpm (241,920 GPD). Short-term, higher rates could reach up to 200 – 250 gpm (288,000 – 360,000 GPD) (RC Resources, 2008c). Discharge rates will be continuously monitored using a recording flow meter at the point of discharge from the adit (RC Resources, 2008d).

With a percolation rate of 144 ft/day, a 225 square foot gravel infiltration area would accommodate flows of the anticipated maximum 168 gpm from the adit discharge. To be conservative and to accommodate the 250 gpm design flow of the water treatment plant, three 30 foot by 20 foot (gravel area) ponds are proposed (**Figure O-3**). The additional ponds will serve to provide a contingency and allow for cleaning and maintenance.

The percolation ponds would be excavated to intersect the gravel at eight to ten feet below ground surface. Pond side slopes would be 2:1 (H:V). The three ponds would have a surface disturbance area of about 1.0 acres including stormwater diversion berms/ditches and stockpiles for spoil and topsoil. The ponds would be connected with internal overflow channels and surrounded by a fence to prevent entry by wildlife. (**Figure O-3**; RC Resources, 2008b)

(c) Wastewater Holding Ponds, Treatment System Description, Residuals, and Chemical Additions:

Water conveyed from the adit will be routed to a lined pond adjacent to the support facilities area (**Figure 7;** RC Resources, 2008a). Another pond will be used for storage of treated effluent water. The ponds will have a combined storage capacity of approximately 600,000 gallons. (RC Resources, 2008c) Each pond will have the dimensions of 85 feet in length by 60 feet in width by approximately 10.5 feet in depth. The ponds will be lined with a Linear Low Density Polyethylene (LLDPE) 40 mil geomembrane. Depth to ground water is greater than 14 feet from the surface according to test pit investigations in the area (RC Resources, 2008b) and likely closer to 25 feet (MDEQ, USFS, 2001).

These ponds will include measures to keep wildlife out either by fencing the ponds or fabricating covers over the ponds (RC Resources, 2008c).

Water from the raw water pond will be pumped to the treatment plant for removal of oils and grease, metals, and nitrogen prior to discharge to the Outfall. A Flow Diagram indicating the components of the water management system for the evaluation adit is shown in **Figure 3**, with the Water Treatment Process shown in more detail on **Figure J-2**. The treatment plant will be contained inside a heated, pre-engineered steel building erected on a concrete slab in accordance with local building codes. The water treatment plant will be located adjacent to the mine office on RC Resources, Inc. property located near Highway 200.

A description of the treatment process is summarized below, and shown in **Figure J-2**:

1. Mine water is pumped from the surge pond to an equalization tank, where oil and grease are separated from the water and transferred to drums for off-site disposal;
2. Methanol is mixed with water;
3. Water is pumped to a sequencing batch reactor to biologically remove nitrate and ammonia;
4. Water is decanted from the batch reactor and routed to ultra filtration membranes for metals and solids removal; and
5. Filtrate from UF membranes is routed to discharge; if additional polishing is required for nitrate and ammonia, UF filtrate would be routed through ionic and/or cationic ion exchange resin tanks, then to discharge.

Residuals produced as a result of the water treatment process include oil, grease, and non-leachable solids. The oil and grease will be transferred into drums and recycled along with other used oils products produced from the mine. Solids will be collected from the ultra filtration membranes and bio-reactors, thickened, and then routed through a filter press for dewatering. The dewatered solids will be cake-like in nature and will be disposed of off-site. The ion exchange resins will be regenerated in one of two ways: the resin will be replaced on a batch basis and the spent resin will be regenerated off-site at a commercial regeneration facility; or the resin will be regenerated on-site and the residual brine will be hauled off-site to a commercial facility for final processing and disposal.

Chemicals used in the treatment process include:

- Poly aluminum chloride (coagulant);
- Sodium sulfide (metal precipitant);
- Ferric chloride (metal precipitant);
- Bleach (membrane cleaning agent);
- Methanol (organic feed for biological systems);
- Sodium hydroxide (membrane cleaning agent); and
- Hydrochloric acid (membrane cleaning agent).

The water plant will be operated 24-hours per day, 7-days per week as long as water is being pumped from the mine. The facility will be computer controlled, with a human operator attending to all system components on an 8-hour per day, 5-day per week shift. During off-shift hours, the plant control system will provide real-time plant status to off-site computers monitored by mine staff. There will be an emergency alarm system to notify the operator and mine staff of system upsets or malfunctions (RC Resources, 2008c).

(d) Groundwater Characteristics and Monitoring

The treated water from the infiltration site will enter the basal gravel and flow southwestward toward the Clark Fork River. Percolation tests conservatively estimate the basal gravel percolation rate to be a minimum of 144 ft\day. The majority of the water is expected to pass through the basal gravel and into the underlying fractured bedrock. Flow in the basal gravel and bedrock aquifers would eventually reach the Clark Fork River, but geologic cross-sectional data (**Figure O-2**) indicate that these aquifers are well below the riverbed elevation.

Water Quality data for the Basal Gravel Aquifer is presented in **Table 3.** The table presents average, minimum and maximum results for dissolved constituents from monitoring wells completed in the basal gravel aquifer (MW-84-7, -85-17, -85-18, -85–19, and MW-7). Dissolved average water quality is used to assess water quality effects in groundwater systems since short-term variations in water quality are buffered by mixing within the groundwater system.

Treated water discharge to the groundwater infiltration system will be sampled at the infiltration ponds in accordance with the schedule in **Table E-2** (weekly sampling of nutrients and metals). In addition, groundwater monitoring will be conducted on a weekly to monthly basis during operations and infiltration discharge to document water quality trends (**Table E-2**). There are three existing monitoring wells (MW06-1, MW06-2 and MW06-3) adjacent to the proposed infiltration site. One well was installed in the basal gravel unit upgradient from the infiltration site, and two were installed downgradient (**Figure O-1**). MW06-1 (closest and upgradient well) has been dry during all previous monitoring events (RC Resources, 2008d).

The monitoring wells will be sampled in accordance with the groundwater sampling protocol described in Attachment A of Appendix E as submitted to Montana DEQ as part of Exploration Adit Application Revisions. The wells will be sampled and water samples analyzed for parameters listed in **Table E-3**. Additional monitoring requirements may be included as required by the Montana Department of Environmental Quality for public water supply monitoring. (RC Resources, 2008d).

(e) Local Hydrogeology

Test pit excavations up to 15 feet deep in the vicinity of the proposed infiltration pond (T17 – T22) indicate fractured bedrock as shallow as 12 feet below the ground surface. Three of these test pits did not encounter bedrock within the depth of the excavations. The actual thickness of unconsolidated deposits is highly variable. A cross section of the proposed infiltration pond area is shown in **Figure O-2**.

Depth to groundwater in the area of the proposed infiltration site is estimated to be approximately 25 feet below ground surface (MDEQ, USFS, 2001). The actual depth of ground water in the general vicinity of the infiltration pond site is highly variable depending on topography, lithology, and location relative to recharge sources and fluctuates seasonally (MDEQ, USFS, 2001). Groundwater flow is generally in a westerly to southwesterly direction toward the Clark Fork River.

Although groundwater flow paths can not be known exactly, the nearest private water supply wells potentially affected by the discharge water at the infiltration site are the Steven Babb, the Dan Collins, and the Tom and Sharon Davis wells to the south west and south. The Babb well was constructed in gravel; wells logs are not available for either of the other wells. A tracer test intended to evaluate the potential groundwater connection of the infiltration pond site and private water supplies was conducted in 2006 –2007. The Davis well was sampled during the tracer test. A detailed description of the test is provided in a report submitted to DEQ (Hydrometrics, 2008); no tracer was detected in the Davis well or any of the private wells sampled in the vicinity of the infiltration site over a nine-month period.

The Rock Creek drainage is located southwest of the Cabinet Mountain Wilderness (CMW). Rock Creek flows southwest for about 8 miles from Rock Lake to its confluence with the Clark Fork River at the head of Cabinet Gorge Reservoir, about one mile below Noxon Rapids Dam. The proposed evaluation adit site is located in the headwaters of the West Fork of Rock Creek drainage.

The proposed infiltration site would be located adjacent to the proposed tailings impoundment within the Miller Gulch drainage. The north fork of Miller Gulch drains the south slope of Government Mountain. The south fork drains a terrace associated with the Clark Fork River. Base flow in Miller Gulch is maintained by a spring located on the northern fork just above the Clark Fork River terrace. After passing through a series of beaver ponds, Miller Gulch loses flow to ground water and is generally dry except for intermittent high-flow periods that occur during snowmelt runoff (MTDEQ, USFS, 2001).

Miller Gulch contains hard, calcium-bicarbonate water with low or nondetectable levels of oil and grease, nutrients, and metals. Concentrations of these constituents are below criteria established to protect drinking water supplies, recreation, irrigation, and livestock

watering. Chronic cold-water aquatic life criteria occasionally were exceeded for cadmium and silver during the period of baseline measurement. (MTDEQ, USFS, 2001).

Water quality results from two stations located on the Clark Fork River indicate a moderately hard water (mean 88 mg/L), with concentrations of metals that are generally below water quality criteria. The mean concentration of nitrate plus nitrite as nitrogen equals 0.065 mg/L (MTDEQ, USFS, 2001).

(f) Effluent Characteristics

Treated water quality will meet groundwater standards and nondegradation criteria. Since effluent is projected to meet Montana groundwater quality standards at the end of the pipe, a mixing zone is not being requested. Estimated water quality prior to treatment is shown in **Table J-2**. The values for ambient groundwater (receiving water) and treated effluent water quality as compared to groundwater quality standards have been presented in **Table 3**. Since discharge will meet water quality standards at the point of infiltration there will be no impact to downgradient private water supply wells.

If you require any additional information or would like us to go over the plan in more detail, please call me at 406-721-8243.

Sincerely,

Doug Parker
Principal, Senior Scientist

Attachments

c: Lisa Boettcher
Wayne Jepson

REFERENCES

Hydrometrics, Inc., 1997. Water Management Plan for Alternative 5 – Surface Disposal of Tailings Paste. Asarco Rock Creek Project. January 1997.

Hydrometrics, 2008. RC Resources, Inc. Rock Creek Exploration Project Tracer Test Status Report. Submitted to Montana DEQ February 2008

Montana Department of Environmental Quality and U.S. Forest Service (MDEQ, USFS), 2001. Final Environmental Impact Statement Rock Creek Project Volume I. Prepared by Montana Department of Environmental Quality and U.S. Forest Service. September 2001.

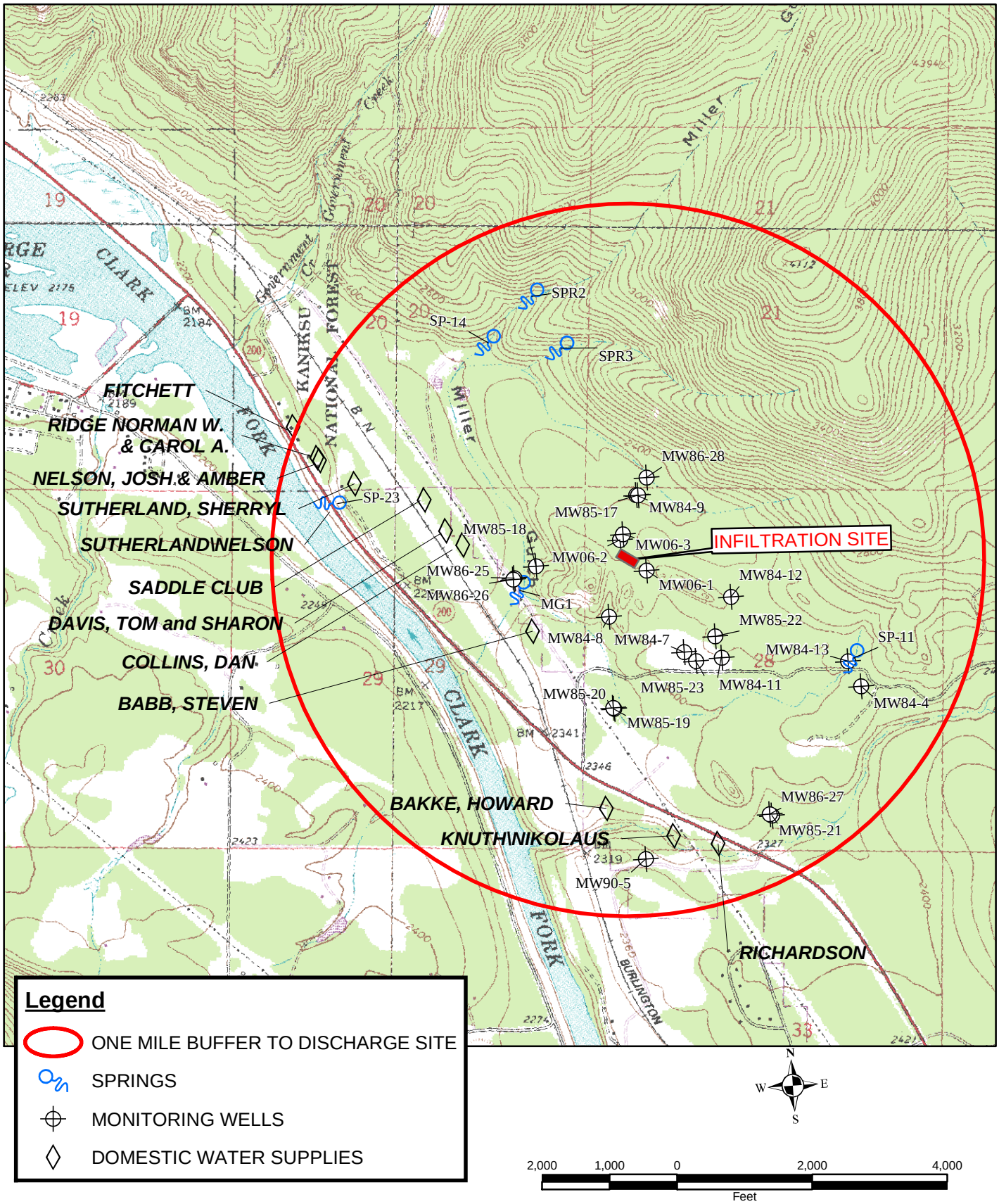
Rock Creek Resources, Inc. (RC Resources), 2008a. Rock Creek Evaluation Adit Project Revised Application for Exploration License. Prepared for Montana Department of Environmental Quality and Kootenai National Forest. Prepared by Rock Creek Resources, Inc. January 2006, Revised February 2008.

Rock Creek Resources, Inc. (RC Resources), 2008b. Rock Creek Evaluation Adit Groundwater Discharge Site Investigation and Percolation Pond Design. Prepared for Montana Department of Environmental Quality and Kootenai National Forest. Prepared by Rock Creek Resources, Inc. March 2006, Revised February 2008. Appendix O of Rock Creek Evaluation Adit Project Revised Application for Exploration License.

Rock Creek Resources, Inc. (RC Resources), 2008c. Discharge Pipeline and Water Treatment Plant for the RC Resources, Inc. Rock Creek Evaluation Adit Support Facilities Site. Prepared for Montana Department of Environmental Quality. Prepared by Rock Creek Resources, Inc. August 2006, Revised January 2007 and February 2008. Appendix J of Rock Creek Evaluation Adit Project Revised Application for Exploration License.

Rock Creek Resources, Inc. (RC Resources), 2008d. Water Resources Monitoring Plan for the Rock Creek Resources Rock Creek Evaluation Adit. Prepared for Montana Department of Environmental Quality. Prepared by Rock Creek Resources, Inc. November 2005, Revised January and August 2006, February 2007, and February 2008. Appendix E of Rock Creek Evaluation Adit Project Revised Application for Exploration License.

FIGURES 1, 2 and 3
TABLES 1, 2 and 3

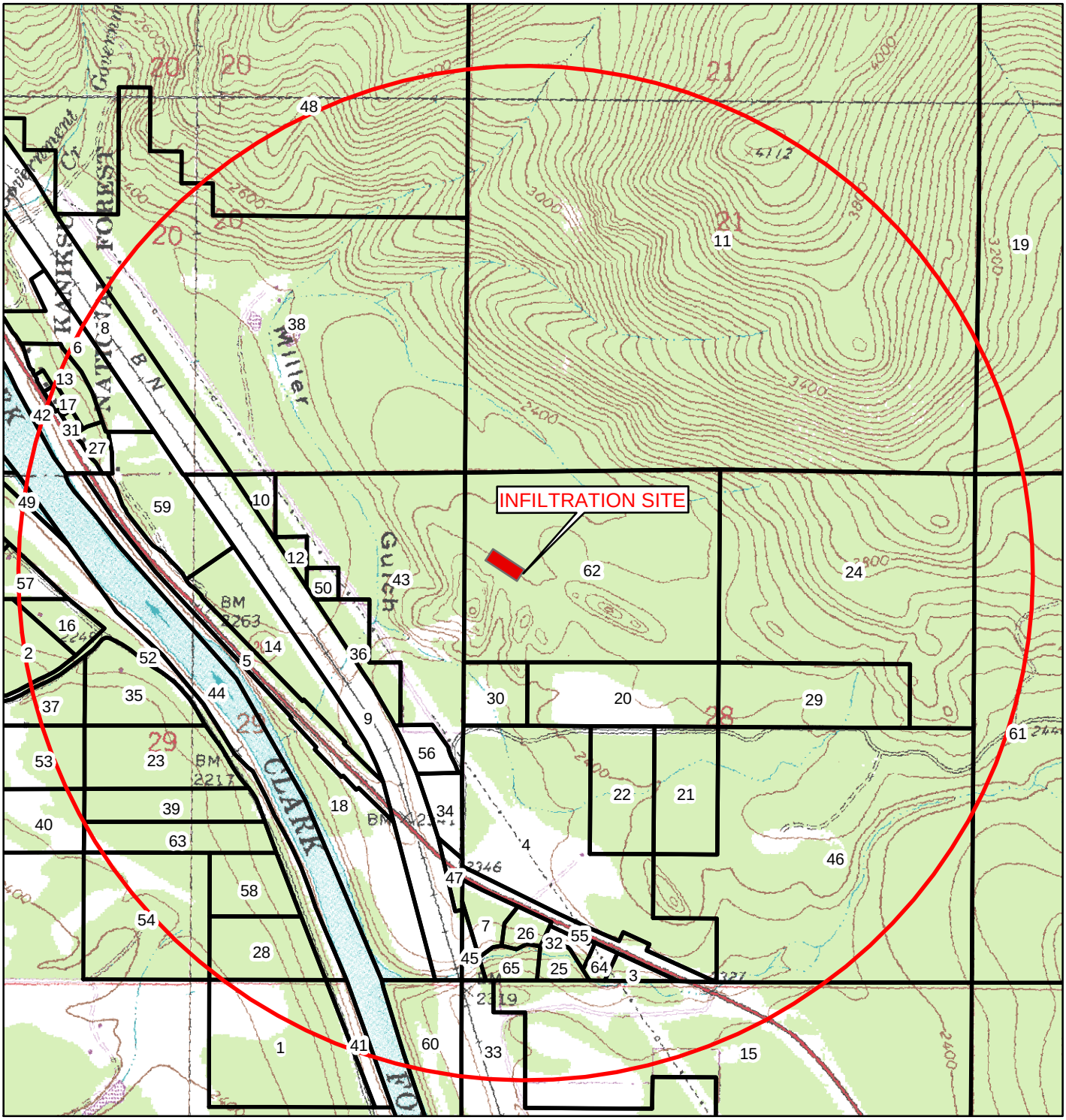


ROCK CREEK EVALUATION ADIT
RC RESOURCES
SANDERS COUNTY, MT

DISCHARGE VICINITY MAP SURFACE WATER FEATURES DOMESTIC WATER SUPPLIES AND SPRINGS

FIGURE
1

Hydrometrics, Inc.
Consulting Scientists and Engineers



Legend

ONE MILE BUFFER TO DISCHARGE SITE

6 PROPERTY BOUNDARY AND NUMBER

N
W E
S

1,500 750 0 1,500 3,000

Feet

ROCK CREEK EVALUATION ADIT
RC RESOURCES
SANDERS COUNTY, MT

PROPERTY OWNERSHIP WITHIN ONE MILE RADIUS OF DISCHARGE LOCATION

FIGURE
2

Hydrometrics, Inc.
Consulting Scientists and Engineers

Table 1: PROPERTY OWNERSHIP WITHIN ONE MILE OF INFILTRATION PIT

Rock Creek Evaluation Adit Project

PARCEL	PARCELID	OWNER TYPE	OWNER NAMES	LEGAL DESCRIPTION	PROPERTY STREET*
1	35368732102010000	Private	BURNS CARL P & LOLA E	PLAT G IN LT 2(N2NE); W OF CO RD 37.4 ACRES	
2	35368729201200000	Private	DOUGHERTY ROBERT W & BETTE	PLAT G6 IN SWNW 22 AC	
3	35368728301070000	Private	RICHARDSON STANLEY W & SCOTT	PLAT J1 IN S2SESW 2.5 AC	
4	35368728302010000	Private	RC RESOURCES INC	PLAT D NWSESW, NWSW 72 AC	
5	35368729101990000	Right of Way	STATE OF MONTANA	HWY 200	
6	35368720301250000	Private	SHARP LISA R	PLAT C 16.2 AC	
7	35368728301160000	Private	BAKKE HOWARD L & SHIRLEY M	ROCK CREEK LOT 1 IN SW 5.5 AC	
8	35368720000000000	Undetermined			
9	35368729101890000	Utility Easement	BURLINGTON NORTHERN RR	BNRR RW CA IN E2, 54 ACRES	MT HWY 200
10	35368729101100000	Private	ROCKY RIDGE SADDLE CLUB	TR 1 COS 2160 IN NWNWNE, PLAT R1 3.86 AC01 SPLIT FROM 17971	
11	35368721101010000	USDA Forest Service	USDA FOREST SERVICE	ALL	MILLER GUL
12	35368729101150000	Private	DAVIS THOMAS E & SHARON L	TR 2, COS 2160 IN SENWSE, PLATR2 2.17AC	
13	35368720301350000	Private	WELTZ RYAN M & TAMRA L	TR IN S1\2SW COS 150 PLAT K 7.05 AC	
14	35368729101500000	Private	BUCKHILL FINANCIAL LLC	PAR 2 COS 2552 LYING BETWEEN MT 200 & BNRW IN N1/2&11/2SE PLAT A 23.45 ACRES	
15	35368733101010000	USDA Forest Service	USDA FOREST SERVICE	IN N2 & IN N2SE, 258 ACRES	MT HWY 200
16	35368729201100000	Private	CLUZEN ROBERT C	PLAT C IN NESWNW 5 AC	
17	35368720301420000	Private	BUCKNER DOUG	PLAT H IN E2SWSW 1.03 AC	
18	35368729101450000	Utilityl Ease	AVISTA CORPORATION	PLAT WWP IN NWNE 43.6 AC	
19	35368722201010000	USDA Forest Service	USDA FOREST SERVICE	W2NE, NWSE, W2, 440 ACRES	ROCK CRK
20	35368728201100000	Private	RC RESOURCES INC	SESWNW, S2SENW PLAT A1 30 AC	
21	35368728302500000	Private	RC RESOURCES INC	E2NESW PLAT C 20 AC	
22	35368728302300000	Private	RC RESOURCES INC	W2NESW PLAT C1 20 AC	
23	35368729301550000	Private	MIKKELSON JAMES & CATHLEEN	PLAT G4 N2NESW 23 AC	

Table 1: PROPERTY OWNERSHIP WITHIN ONE MILE OF INFILTRATION PIT

Rock Creek Evaluation Adit Project

PARCEL	PARCELID	OWNER TYPE	OWNER NAMES	LEGAL DESCRIPTION	PROPERTY STREET*
24	35368728101010000	USDA Forest Service	USDA FOREST SERVICE	N2NE, N2S2NE, SESENE, 130 ACRES	ROCK CRK
25	35368728301050000	Private	WANAMAKER LARRY E	ROCK CREEK LOT 4 3.6 AC	
26	35368728301140000	Private	TOMS KARL T & AYUMI O	ROCK CREEK LOT 2 IN SW 3.5 AC	
27	35368720301500000	Private	NELSON JOSHUA L & AMBER J	PLAT F SWSESW 2.79 AC	
28	35368729301750000	Private	JEWETT STEVEN K	PLAT G1 IN S2SWSE 16.43 AC	
29	35368728201200000	Private	RC RESOURCES INC	S2SWNE, SWSENE PLAT JB 30 AC	
30	35368728201010000	Private	RC RESOURCES INC	PLAT A SWSWNW 10 AC	ROCK CRK
31	35368720301490000	Private	RIDGE NORMAN W & CAROL A	PLAT G IN E2SWSW .48 AC	
32	35368728301120000	Private	NIKOLAUS CHARLES J	PLAT M1 IN S2SW 2.124 AC	
33	35368733000000000	Undetermined			
34	35368729101400000	Private	NASH JAMES R & SLORA KATHRYN F	TR 1 COS 2191 LYING E OF BNRW IN E2SE PLAT E1 6.15 AC	
35	35368729301500000	Private	STOVER PRESTON C & DARLENE S	PLAT G5 IN G L3 17.57 AC	
36	35368729101250000	Private	BABB STEVEN H	PTN GVT LT 4 & SENE LYING EASTERLY OF BNRW, PLAT L 9.3 AC	
37	35368729301450000	Private	SEXTON MYLES ANDREW & CYNTHIA & REV TRUST	PLAT G7 IN S2SWNW 10.5 AC	
38	35368720401010000	Private	ENGEL DONALD W & MERVYN A	PLAT N IN SENW, SW,M SENE 224 AC	
39	35368729301600000	Private	SOUTHARD LADONNA	TR 3A COS 786 14.26 AC	
40	35368729301370000	Private	MEILICKE RODNEY W	PLAT G9 IN S2NWSW 15.72 AC	
41	35368732102350000	Local Government	SANDERS COUNTY	PLAT SC IN E2, 25 ACRES	
42	35368720000000000	Undetermined			
43	35368729101010000	USDA Forest Service	USA	PLAT US	
44		Water			
45	35368728000000000	Undetermined			
46	35368728401010000	Private	RC RESOURCES INC	PLAT K IN NESESW, SE 172.12 AC	
47	35368729101550000	Private	WANAMAKER LARRY	PLAT W2A IN SE .63 AC	

Table 1: PROPERTY OWNERSHIP WITHIN ONE MILE OF INFILTRATION PIT

Rock Creek Evaluation Adit Project

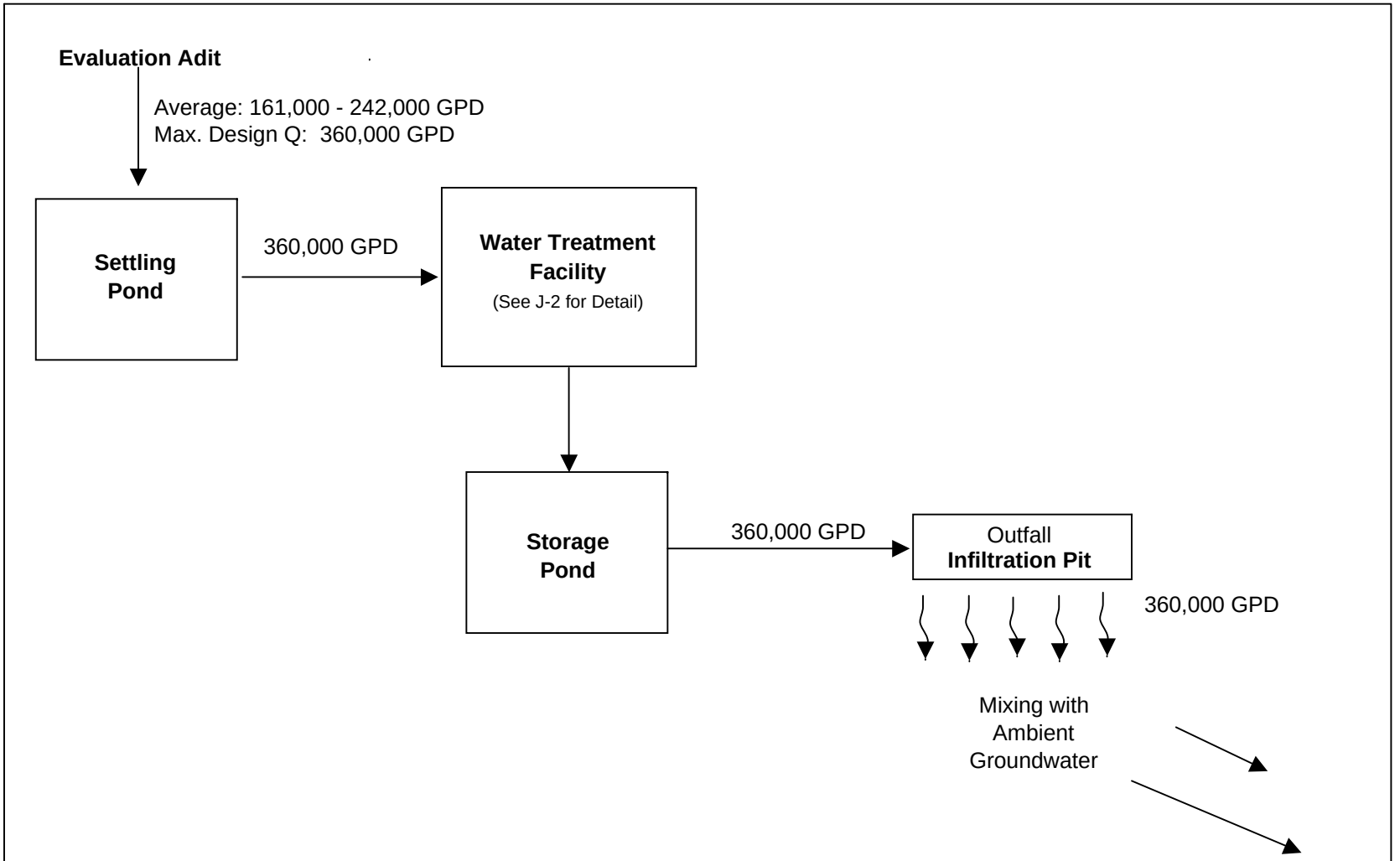
PARCEL	PARCELID	OWNER TYPE	OWNER NAMES	LEGAL DESCRIPTION	PROPERTY STREET*
48	35368720101010000	USDA Forest Service	USDA FOREST SERVICE	NE & PTN NW, APROX 283 ACRES	GOVERNMENT MTN
49	35368729000000000	Undetermined			
50	35368729101200000	Private	COLLINS DONALD D	TR 3 COS 2160 IN SENWNE PLAT R3 2.35 AC	
51	35368720301460000	Private	RIDGE NORMAN W & CAROL A	PLAT J IN E2SWSW .17 AC & PLATG .48 AC TOTAL ACRES .65 TWO LEGAL TRACTS	MT HWY 200
52	35368729201350000	Local Government	SANDERS COUNTY	PLAT SC	
53	35368729301400000	Private	SEXTON 2002 REV TRUST & SEXTON MYLES ANDREW & CYNTHIA	PLAT G8 IN N2N2SW 19.1 AC	
54	35368729301010000	Private	DOHRMANN DEBORAH A & ALLDER HARLEY G	PLAT F IN SESW 40 AC	
55		Right of Way			
56	35368729101300000	Private	SANDERS COUNTY	COS 1049 IN NESE PLAT E 5 AC	
57	35368729201050000	Private	LAMPSHIRE BARBARA A	PLAT D IN NWNW 6.75 AC	
58	35368729301700000	Private	DEVITT MICHAEL LEE & DEVITT STEVEN DOUGLAS	PLAT G2 IN N2SWSE 12.5 ACRES	
59	35368720301560000	Private	SUTHERLAND SHERRYL	YODER MINOR LOT 1 S2SESW PLAT D1 4 AC	
60	35368732000000000	Undetermined			
61	35368727101010000	USDA Forest Service	USDA FOREST SERVICE	ALL	MCKAY CRK
62	35368728201050000	Private	RC RESOURCES INC	PLAT JB N2NW, N2S2NW 120 AC	
63	35368729301650000	Private	WILKINSON SHAUN M & TERI J	PLAT G3B 14.22 AC	
64	35368728301100000	Private	KNUTH RONALD D & JOELLEN	PLAT M IN S2S2SW 2.019 AC COS 1763 TR A LYING S OF HWY	
65	35368728301030000	Private	WANAMAKER LARRY E	ROCK CREEK LOT 3 IN SW 4.4 AC	

* All properties in Noxon, Montana 59853

TABLE 2: PRIVATE WATER SUPPLY INVENTORY IN VICINITY OF INFILTRATION PONDS

Rock Creek Evaluation Adit Project

SOURCE	OWNER	STREET ADDRESS	MAILING ADDRESS	MONTANA STATE PLANE COORDINATES NAD 83(FT)	
				EASTING	NORTHING
WELL	RICHARDSON STANLEY W. & SCOTT	1766 HWY 200	1766 MT HIGHWAY 200 NOXON MT 59853	444454	1418595
WELL	BAKKE, HOWARD	1710 HWY 200	PO BOX 1627 NOXON, 59853	442808	1419271
WELL	FITCHETT		1591 HWY 200	438570	1425231
WELL	RIDGE, NORMAN W. & CAROL A.	1599 HWY 200	9245 N FINUCANE DR, HAYDEN ID 83835	438915	1424772
WELL	NELSON, JOSH & AMBER	1601 HWY 200	1601 MT HIGHWAY 200, NOXON MT 59853	438954	1424701
WELL	SUTHERLAND, SHERRYL		20 GRANDVIEW DR, NOXON MT 59853	439456	1424323
WELL	BABB, STEVEN		PO BOX 1551 NOXON 59853	441928	1421947
WELL	COLLINS, DAN		305 Boorman Lane, Kalispell, MT 59901	440991	1423308
SHARED SPRING (SP-23)	SUTHERLAND\NELSON			439168	1424048
WELL	SADDLE CLUB		C\O 80 PILGRIM CK RD, NOXON, MT	440476	1423991
WELL	DAVIS, TOM & SHARON	79 Government Mountain Road	PO BOX 2, NOXON 59853	440757	1423528
SHARED WELL	KNUTH\NIKOLAUS		1758 MT HIGHWAY 200, NOXON, MT 59853\ 1760 MT HIGHWAY 200 NOXON, MT 59853	443797	1418774
SPRING	ENGEL DONALD W & MERVYN A SP-14		PO BOX 1484, NOXON, MT 59853	441677	1426308
SPRING	ENGEL DONALD W & MERVYN A SPR-2		PO BOX 1484, NOXON, MT 59853	442332	1426944
SPRING	ENGEL DONALD W & MERVYN A SPR-3		PO BOX 1484, NOXON, MT 59853	442763	1426128



ROCK CREEK EVALUATION ADIT **RC RESOURCES** **SANDERS COUNTY, MT**	**FIGURE WATER BALANCE COMPONENTS**	**FIGURE** **3**

K:\Project\1094\Evaluation Adit\Figure 3_Flow Diagram.xls

Hydrometrics, Inc.
Consulting Scientists and Engineers

TABLE 3: ROCK CREEK INFILTRATION PIT WATER QUALITY EVALUATION

Parameter	Units	Receiving Water Quality Basal Gravel Aquifer (1)				Treated Discharge Water Quality Expected	Human Health Standard (2) Ground Water	Nondeg. Criteria (3)	Trigger Value (2)	Chemical Category (2)	Required Reporting Values (4)
		# of samples	Average	Min	Max						
Field Measurements											
pH	s.u.	14	7.8	7.3	8.2	6.5 - 8.5	----	----	----	----	----
SC	umhos/cm	17	405	177	579	----	----	----	----	----	----
Solids, Alkalinity & Nutrients											
Total Suspended Solids	mg/L	23	8161	9.6	55948	<1	----	----	----	----	----
Total Hardness (as $CaCO_3$)		23	218	81	347	----	----	----	----	----	----
Total Alkalinity (as $CaCO_3$)		22	226	62	330	----	----	----	----	----	----
Ammonia (NH_3 □□ □)	mg/L	22	0.17	0.01	1.2	----	----	----	----	----	----
Nitrate + nitrite as N	mg/L	22	0.23	0.02	3.8	<1	10	1.5	5	Toxic	0.01
Total Kjeldahl Nitrogen (as N)		22	0.62	0.01	8.8	----	----	----	----	----	----
Orthophosphate (PO_4-□)	mg/L	22	0.056	0.01	0.2	----	----	----	----	----	----
Total Phosphorous	mg/L	22	1.10	0.038	15.0	<1	----	----	0.001	Nutrient	0.001
Common Ions											
Sulfate (SO_4)	mg/L	19	9.1	2.0	23.0	----	----	----	----	Toxic	----
Trace Metals											
Aluminum (DIS)	mg/L	22	0.049	0.005	0.1	----	----	----	----	Toxic	0.03
Antimony (DIS)	mg/L	25	<0.005	<0.003	<0.01	<0.0009	0.006	0.0009	0.004	Toxic	0.003
Arsenic (DIS)	mg/L	22	0.0019	0.001	0.005	<0.001	0.01	NAI	NAI	Carcinogen	0.001
Barium (DIS)	mg/L	25	0.153	0.057	0.32	<2.0	2.00	----	0.002	Toxic	0.005
Beryllium (DIS)	mg/L	20	0.0006	0.001	0.001	<0.001	0.004	NAI	NAI	Carcinogen	0.001
Boron (DIS)	mg/L	5	0.01	0.01	0.03	<0.1	----	----	----	----	----
Cadmium (DIS)	mg/L	22	0.00061	0.0001	0.0035	<0.001	0.005	0.00075	0.0001	Toxic	0.00008
Cobalt (DIS)	mg/L	6	<0.02	<0.02	<0.02	----	----	----	----	----	----
Chromium (DIS)	mg/L	25	<0.015	<0.005	<0.033	0.01	0.1	0.015	0.001	Toxic	0.001
Copper (DIS)	mg/L	22	0.0012	0.001	0.005	<0.05	1.3	0.195	0.0005	Toxic	0.001
Iron (DIS)	mg/L	22	0.070	0.005	0.25	<0.30	0.30 #	----	----	Narrative	0.05
Lead (DIS)	mg/L	22	0.002	0.001	0.003	<0.001	0.015	0.0023	0.0001	Toxic	0.0005
Manganese (DIS)	mg/L	22	0.24	0.01	1.10	<0.05	0.05#	----	----	Narrative	0.005
Mercury (DIS)	mg/L	22	<0.0003	<0.0002	<0.0005	<0.0001	0.002	NAI	----	Toxic	0.00001
Molybdenum (DIS)	mg/L	6	0.02	0.02	0.02	----	----	----	----	----	----
Nickel (DIS)	mg/L	20	0.01	0.01	0.02	<0.01	0.1	0.015	0.0005	Toxic	0.01
Selenium (DIS)	mg/L	12	0.003	0.001	0.006	<0.001	0.05	0.008	0.0006	Toxic	0.001
Silver (DIS)	mg/L	22	<0.0005	<0.0002	<0.003	<0.001	0.1	0.015	0.0002	Toxic	0.0005
Thallium (DIS)	mg/L	20	0.001	0.001	0.003	<0.001	0.002	0.0003	0.0003	Toxic	0.0002
Zinc (DIS)	mg/L	22	0.028	0.001	0.2	<0.01	2.0	0.30	0.005	Toxic	0.01

Notes:

NAI = No Allowable Increase ---- = Not Applicable

(1) Baseline Water Quality - Data source Groundwater Evaluation.xls [Subset of RckCkDataToDate_Reviewed.xls (01/30/08)], Water Quality Data From Basal Gravel Aquifer including 1985 - 2007 Data from MW-17, -18, -19, and -7.

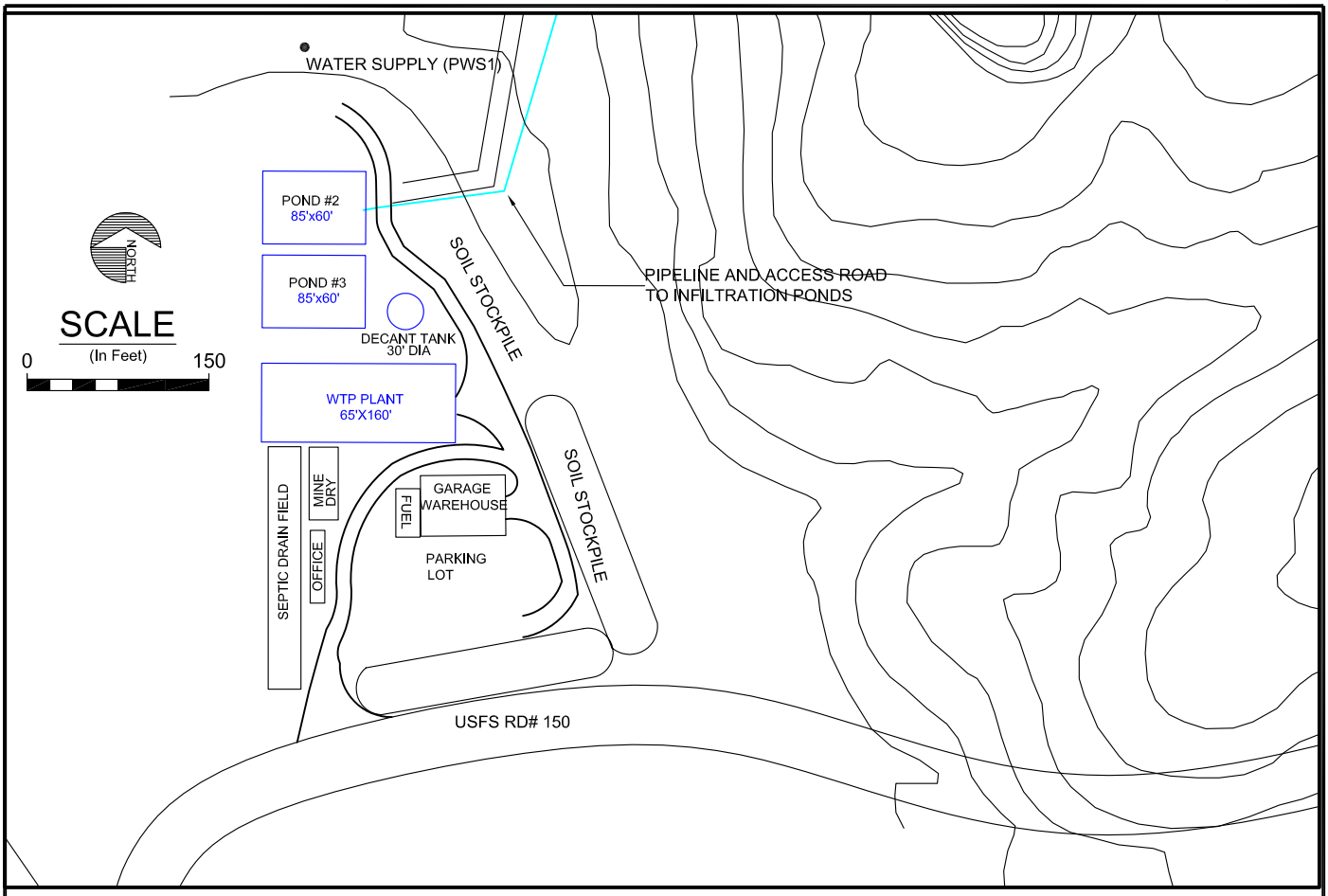
(2) Water Quality Standard - source WQB-7 (February 2006).
#iron, manganese - narrative standard (guidance level given based on Secondary Federal MCL)

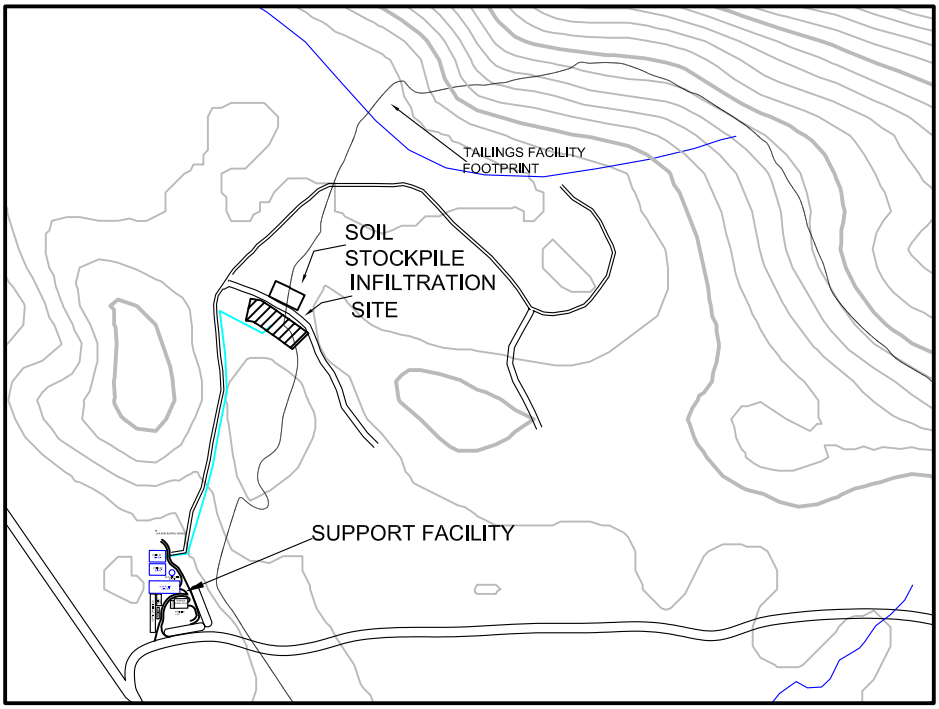
(3) Nondegradation Criteria - Calculated limits based on ARM 17.30.715 as indicated below:
toxic - change is not significant if the resulting concentration outside of a mixing zone designated by the department does not exceed 15% of the lowest applicable standard.
narrative - standard based on maintaining anticipated use or no measurable change in aquatic life or ecological integrity.
carcinogen or bioconcentration factor >300 - concentrations less than or equal to concentrations of receiving water.

(4) Water Quality Standard - source WQB-7 (February 2006).
Arsenic Reporting Limit reduced to achieve data quality control.

FIGURE 7

ROCK CREEK EVALUATION ADIT PROJECT
REVISED APPLICATION FOR EXPLORATION LICENSE





LEGEND

- PROPOSED WATER SUPPLY WELL
- WATER PIPELINE

SCALE
(In Feet)
0 1000

NORTH

ROCK CREEK
EVALUATION ADIT PROJECT
SANDERS COUNTY, MONTANA
REVISED JANUARY 2007

SUPPORT FACILITIES

FIGURE 7

UPDATE TIME: 1:13PM
JOHLAMSO\010507\C:\Data\RockCreek(2)\DWGS\ BASE_SUPPORT.dwg

Hydrometrics, Inc.
Consulting Scientists and Engineers

TABLES E-2 AND E-3

FROM APPENDIX E OF
ROCK CREEK EVALUATION ADIT PROJECT
REVISED APPLICATION FOR EXPLORATION LICENSE

TABLE E-2. GROUNDWATER DISCHARGE SAMPLING REQUIREMENTS

Parameter *(in mg/L unless noted)*	Frequency	Type
Effluent Flow Rate, (gpm)	Continuous	Recorder
pH, s.u.	1/Day	Grab
TSS	1/Day	Grab
Hydrocarbon Sheen	1/Day	Visual
NUTRIENTS		
Ammonia, Total, as N	1/Week	Composite
Nitrite + Nitrate, as N	1/Week	Composite
Total Phosphate, as P	1/Week	Composite
METALS		
Arsenic, Total Recoverable	1/Month	Composite
Arsenic, Dissolved	1/Month	Composite
Cadmium, Total Recoverable	1/ Month	Composite
Cadmium, Dissolved	1/Month	Composite
Copper, Total Recoverable	1/ Month	Composite
Copper, Dissolved	1/Month	Composite
Lead, Total Recoverable	1/ Month	Composite
Lead, Dissolved	1/Month	Composite
Manganese, Total Recoverable	1/ Month	Composite
Manganese, Dissolved	1/Month	Composite
Mercury, Total Recoverable	1/ Month	Composite
Mercury, Dissolved	1/Month	Composite
Zinc, Total Recoverable	1/ Month	Composite
Zinc, Dissolved	1/Month	Composite
Silver, Total Recoverable	1/ Month	Composite
Silver, Dissolved	1/Month	Composite
Selenium, Total Recoverable	1/ Month	Composite

Notes: Required reporting levels shown in Table E-3
Sample from water treatment plant discharge to infiltration ponds

TABLE E-3. ANALYTICAL PARAMETER LIST FOR MONITORING SITES

Parameter *(in mg/L unless noted)*	Required Reporting Value (RRV)
FIELD PARAMETERS	
Flow Rate, (gpm)	NA
pH, s.u.	0.1 SU
Specific Conductivity	5 mg/L
GENERAL CHEMISTRY	
Calcium	5
Magnesium	5
Sodium	5
Bicarbonate	5
Chloride	5
Sulfate	1
Total Dissolved Solids	10
NUTRIENTS [(1)]	
Ammonia, Total, as N	0.05 mg/L
Nitrite + Nitrate, as N	0.05 mg/L
Total Kjeldahl Nitrogen	0.5
Total inorganic Nitrogen, as N	Calculated
Orthophosphate, as P	0.005 mg/L
Total Phosphate, as P	0.01 mg/L
METALS [(2)]	
Antimony	0.003 mg/L
Arsenic	0.003 mg/L
Cadmium	0.0001 mg/L
Copper, Total Recoverable	0.001 mg/L
Lead, Total Recoverable	0.003 mg/L
Manganese, Total Recoverable	0.01 mg/L
Mercury, Total Recoverable	0.0006 mg/L
Zinc, Total Recoverable	0.01 mg/L
Silver, Total Recoverable	0.003 mg/L
Selenium, Total Recoverable	0.001 mg/L

Notes

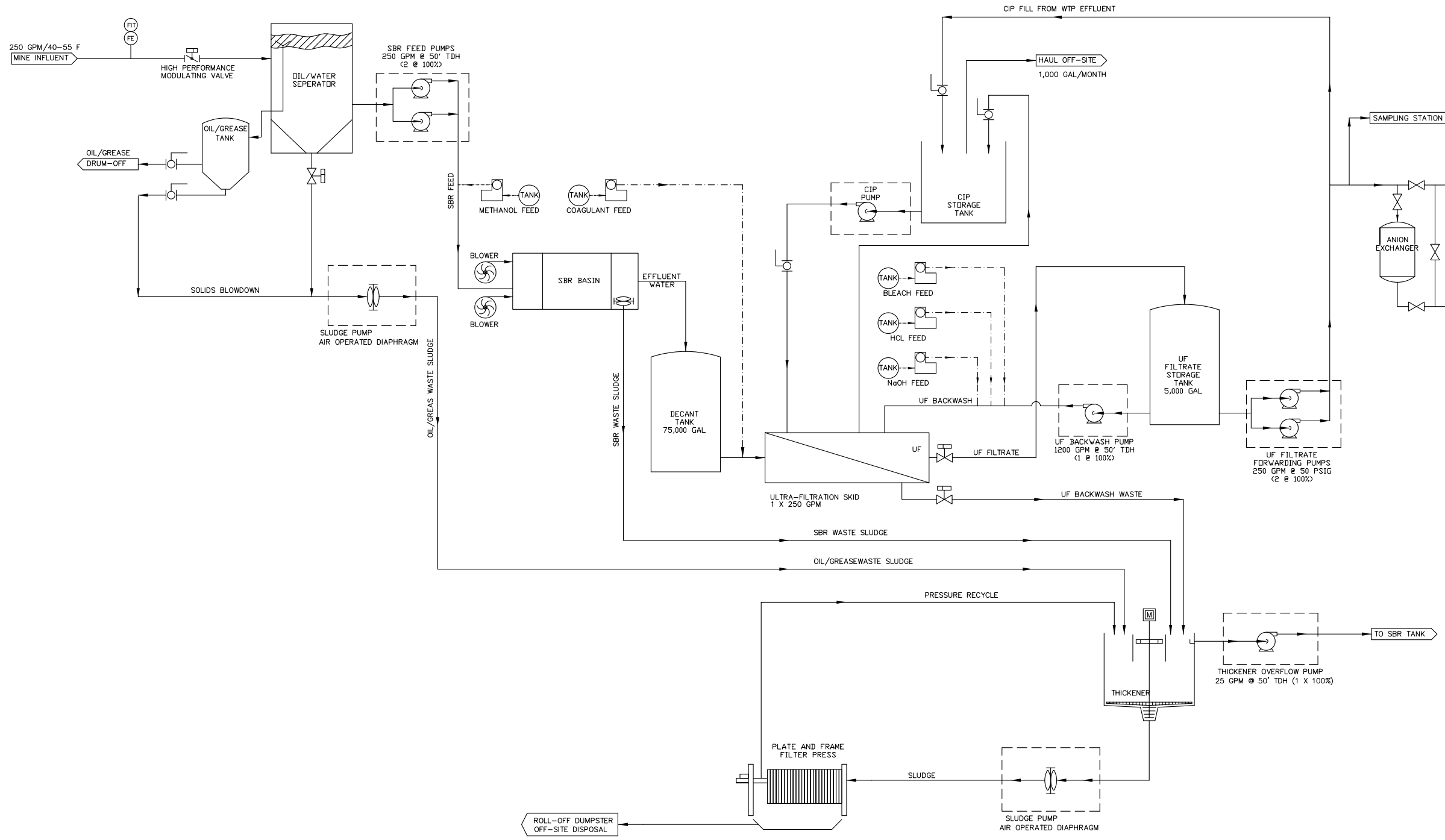
1. Total Kjeldahl Nitrogen applies to surface water samples only.
2. Groundwater samples will be analyzed for dissolved metals and surface water samples for Total Recoverable Metals (except aluminum which is dissolved for both surface water and groundwater samples).

FIGURE J-2 AND TABLE J-2

FROM APPENDIX J OF
ROCK CREEK EVALUATION ADIT PROJECT
REVISED APPLICATION FOR EXPLORATION LICENSE

NOTE:

HOLDING PONDS ASSUMED
TO BE AT BEGINNING OF SYSTEM



NOTE:
ALL PIPING IS SCH80 PVC UNLESS NOTED

CROWN Solutions Inc.

FOR REFERENCE ONLY – NOT FOR CONSTRUCTION

REVISED: JANUARY 2007

ROCK CREEK EVALUATION ADIT PROJECT SANDERS COUNTY, MONTANA	**WATER TREATMENT PROCESS FLOW DIAGRAM**	**FIGURE** **J-2**

UPDATE TIME: 9:43AM
JSD \HEL\011007\I:\Land Projects\1094b202\dwg\109402h013.dwg

Hydrometrics, Inc.
Consulting Scientists and Engineers

TABLE J-2. OPERATIONAL WATER QUALITY AT TROY MINE DECANT POND

Revised March 2008

	Operational Data 1982 through April 1993 & December 2004 through Present					
Parameter	Number of Samples	Number of Samples Below Detection	Average	Standard Deviation	Maximum Value	Minimum Value
Lab pH (SU)	21	---	7.5	0.22	8.1	7.1
Field pH (SU)	58	---	7.5	0.36	8.4	6.0
Total Suspended Solids	67	1	601	882.93	4312	1
Total Dissolved Solids	13	---	234	46.43	316	152
Specific Conductivity	69	---	376	113.61	700	132
Oxygen Demand, Biochemical (BOD)	1	1	<6	---	<6	<6
Oxygen Demand, Chemical (COD)	1	0	71	---	71	71
Organic Carbon, Total (TOC)	1	---	10	---	10	10
Total Hardness (as CaCO3)	65	---	75	33.42	300	21
Alkalinity	13	---	77	13.38	99	43
Calcium	58	---	19.3	6.14	34	5.6
Carbonate (CO3)	14	14	1	0.53	3	1
Fluoride	1	0	0.16	---	0.16	0.16
Magnesium	58	---	5.6	3.22	20.0	1.6
Sodium	56	---	21.2	8.78	46.0	3.7
Potassium	69	0	30.8	17.79	75.0	0.2
Bicarbonate (HCO3)	79	---	75.7	29.43	150	14
Bromide	1	1	<0.5	---	<0.5	<0.5
Sulfate (SO4)	70	1	26.2	14.70	104.0	0.2
Silica	8	---	7.5	1.08	9.1	5.8
Chloride	57	2	5.02	3.16	14.8	0.99
Ammonia (NH3 as N)	65	0	7.47	3.80	16.0	0.37
Total Kjeldahl Nitrogen (as N)	44	---	8.03	4.21	20.0	0.03
Nitrate and Nitrite (as N)	71	0	15.78	7.80	42.0	1.24
Orthophosphate (PO4-P)	41	13	0.03	0.04	0.23	0.01
Total Phosphorous	54	8	0.08	0.07	0.3	0.01
Aluminum TRC	11	0	3.23	4.706	17.0	0.27
Aluminum DISS	3	3	0.083	0.029	0.1	0.05
Antimony TRC	13	1	0.016	0.008	0.04	0.007
Antimony DISS	5	---	0.013	0.003	0.015	0.008
Arsenic TRC	14	4	0.006	0.005	0.018	0.001
Arsenic DISS	6	4	0.003	0.001	0.003	0.001
Barium TRC	4	---	1.045	1.109	2.7	0.352
Barium DISS	3	2	0.119	0.032	0.156	0.1
Beryllium TRC	1	1	<0.001	---	<0.001	<0.001
Beryllium DISS	1	1	<0.001	---	<0.001	<0.001
Boron TRC	1	1	<0.1	---	<0.1	<0.1
Boron DISS	1	1	<0.1	---	<0.1	<0.1
Cadmium TRC	50	19	0.0017	0.0015	0.005	0.0001
Cadmium DISS	7	3	0.0016	0.0023	0.005	0.0001
Chromium TRC	3	2	0.013	0.0147	0.03	0.004
Chromium DISS	1	1	0.001	---	0.001	0.001
Copper TRC	70	---	0.77	1.98	16.0	0.008
Copper DISS	11	---	0.02	0.012	0.04	0.003
Iron TRC	70	0	4.2	13.05	93.8	0.04
Iron DISS	6	2	0.08	0.146	0.380	0.008
Lead TRC	76	5	0.12	0.392	2.7	0.001
Lead DISS	11	5	0.01	0.019	0.050	0.001
Manganese TRC	70	---	0.97	1.62	12	0.017
Manganese DISS	6	---	0.569	0.260	0.791	0.101
Mercury TRC	11	11	0.0004	0.0001	0.001	0.0001
Mercury DISS	1	1	<0.0001	---	<0.0001	<0.0001
Nickel TRC	3	3	0.012	0.008	0.02	0.005
Selenium TRC	2	2	<0.001	---	<0.001	<0.001
Selenium DISS	1	1	<0.001	---	<0.001	<0.001
Silver TRC	71	33	0.005	0.014	0.12	0.0002
Silver DISS	9	5	0.003	0.003	0.01	0.0002
Strontium TRC	2	---	0.087	0.006	0.09	0.082
Strontium DISS	1	---	0.082	---	0.082	0.082
Thallium TRC	1	1	<0.001	---	<0.001	<0.001
Thallium DISS	1	1	<0.001	---	<0.001	<0.001
Zinc TRC	73	12	0.069	0.331	2.8	0.001
Zinc DISS	7	2	0.027	0.033	0.1	0.006
Bacteria, Fecal Coliform	1	1	<1	---	<1	<1
Oil and Grease	25	13	1	0	1	1

Source: WQ_Database_2.xls compiled from Asarco Inc. 1987-1997 and Troy Mine data to current.

Notes: All units are in mg/L unless otherwise indicated.

Total Recoverable metals includes Total and Total Recoverable.

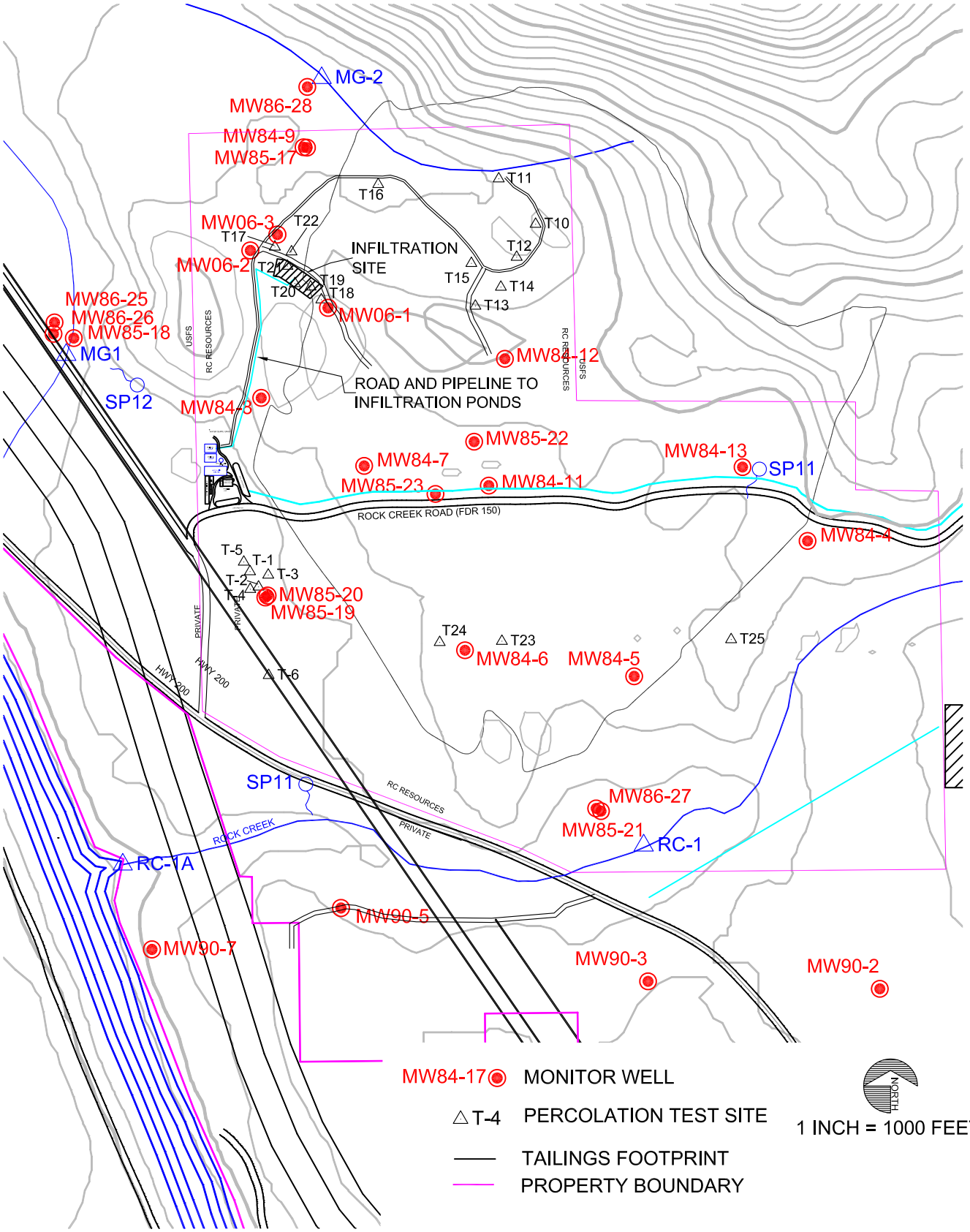
Detection limits were used to calculate statstics when values below detection.

SU = Standard pH units TRC = Total Recoverable

DISS = Dissolved --- = Not Applicable

FIGURES O-1, O-2 AND O-3

FROM APPENDIX O OF
ROCK CREEK EVALUATION ADIT PROJECT
REVISED APPLICATION FOR EXPLORATION LICENSE



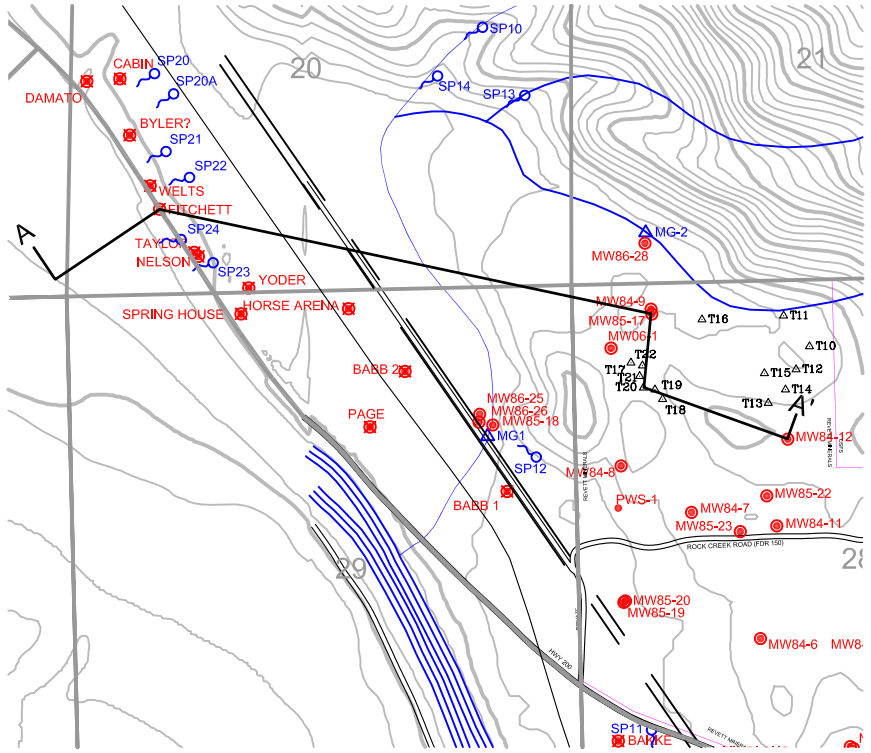
ROCK CREEK PROJECT
SANDERS COUNTY, MT

PERCOLATION TEST SITES
DECEMBER 2005\MARCH 2006

FIGURE
O-1

UPDATE TIME: 10:35AM
JOHLAMSO\020408\C:\Data\RockCreek(2)\DWGS\ PercTestCOMPLETED.dwg

Hydrometrics, Inc.
Consulting Scientists and Engineers



EXPLANATION

NORTH

SCALE
0 (In Feet) 2,000

S22 SPRING

MW84-17 EXISTING MONITORING WELL

MW06-1 PROPOSED MONITORING WELL

FITCHETT DOMESTIC WELL

T22 TEST PIT

LAKE SEDIMENTS; VARVED CLAYEY SILT W\MINOR SAND; AND CLAY

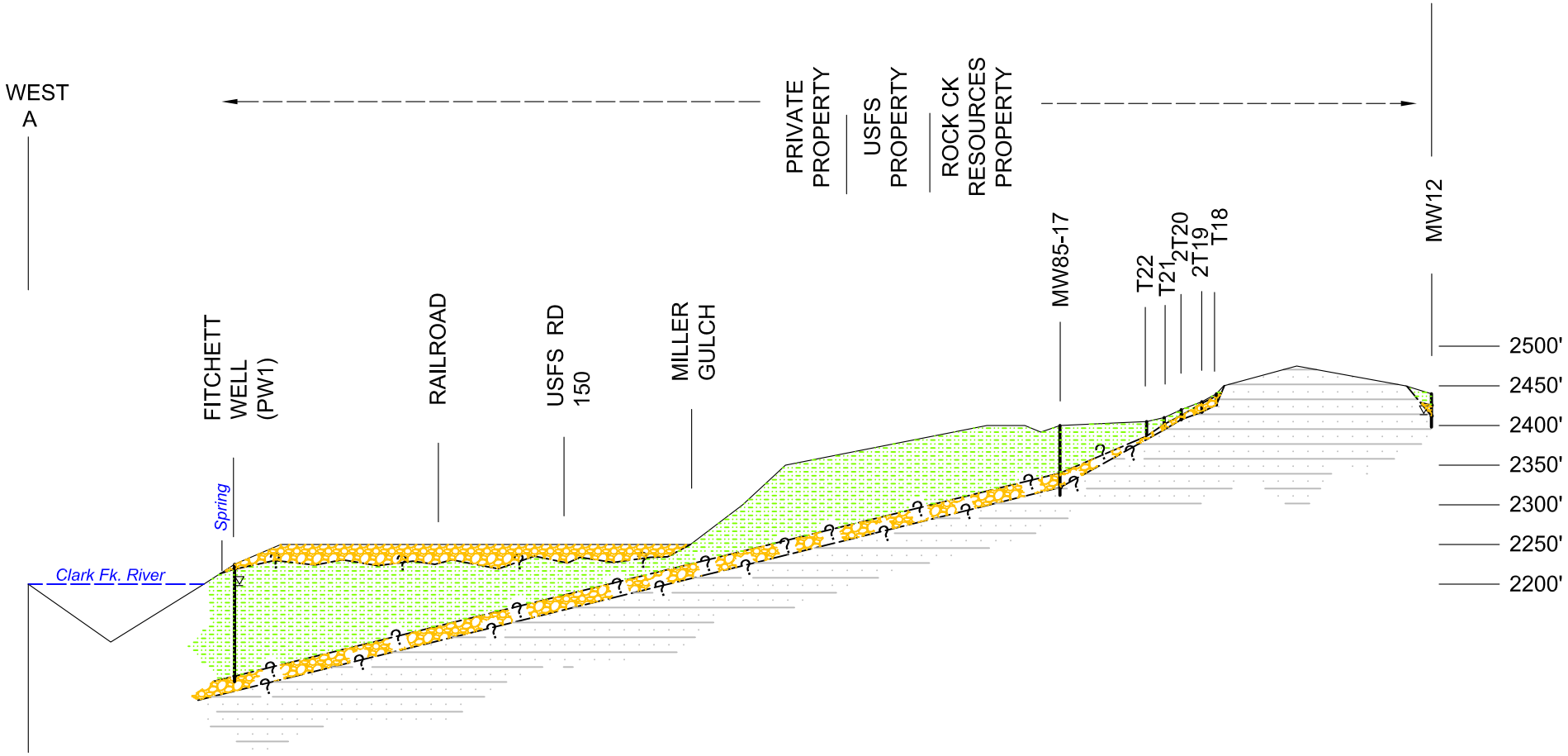
FLUVIO-GLACIAL GRAVEL, POORLY GRADED, VERY LITTLE SILT OR CLAY, BOULDERS TO 3 FEET

BEDROCK

WATER LEVEL

SCALE
0 (In Feet) 1,000

VERTICAL SCALE
1"=200'
V.E. = 5



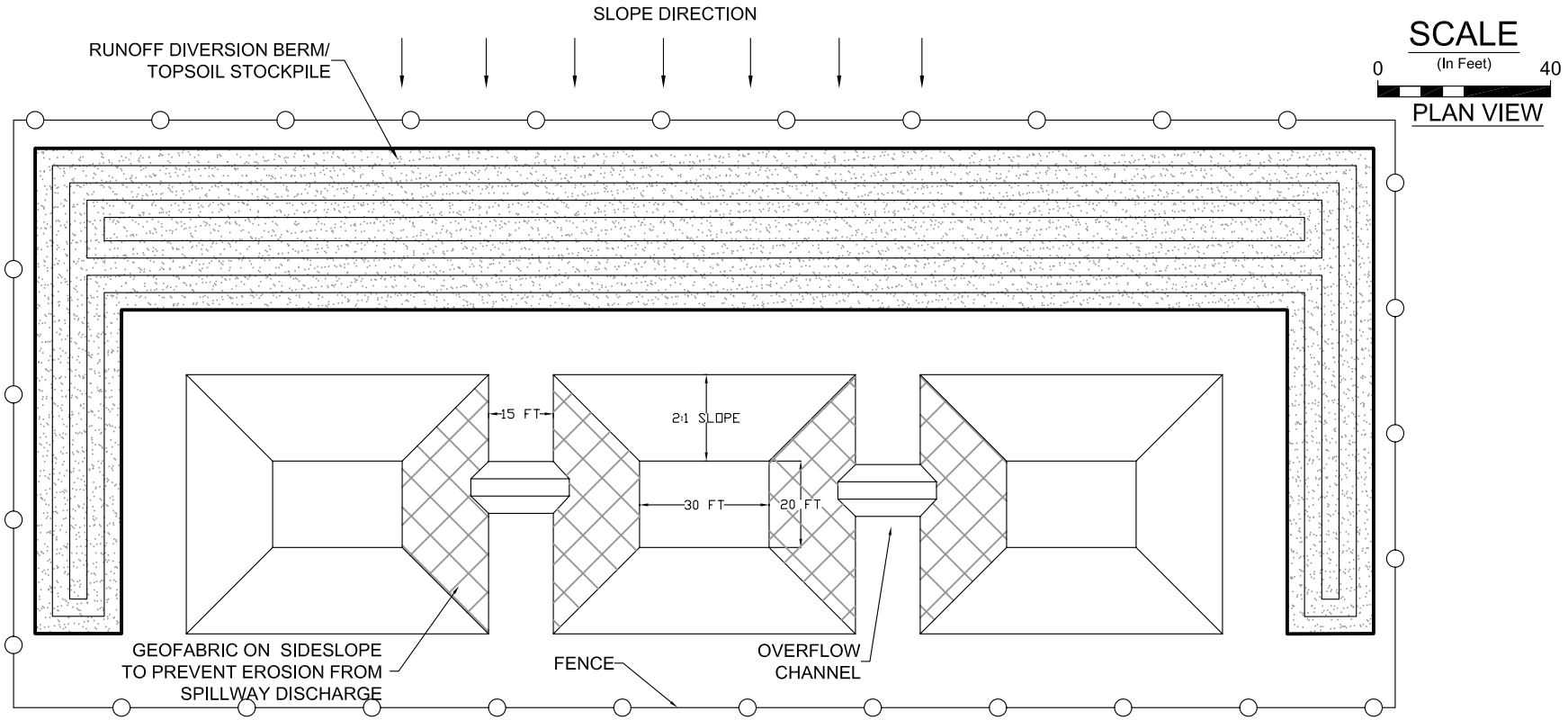
ROCK CREEK
EVALUATION ADIT PROJECT
SANDERS COUNTY, MONTANA

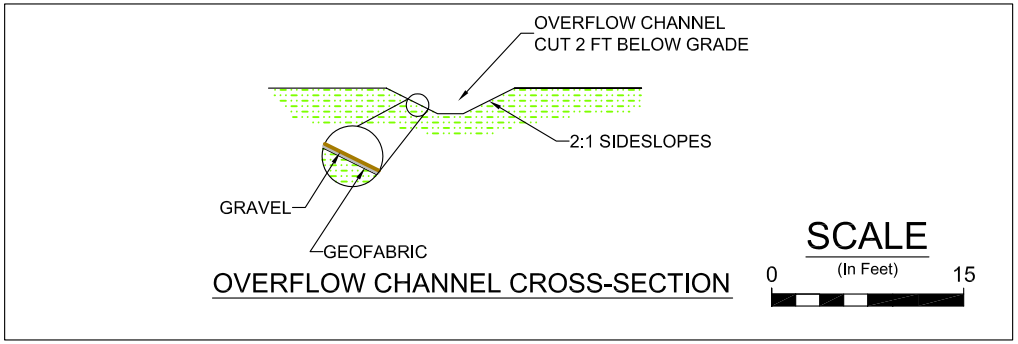
PROPOSED INFILTRATION POND AREA CROSS-SECTION

FIGURE
O-2

UPDATE TIME: 9:41AM
JOHLA\MSO\032206\C:\Data\RockCreek(2)\DWGS\ Perc_Test_xsection.dwg

Hydrometrics, Inc.
Consulting Scientists and Engineers





Hydrometrics, Inc.
Consulting Scientists and Engineers

ROCK CREEK EVALUATION ADIT PROJECT SANDERS COUNTY, MONTANA	**INFILTRATION PONDS**	**FIGURE** **O-3**